

**U. S. Department of Energy
Finding of No Significant Impact
Proposed Decontamination and Decommissioning
of the Zero Power Reactors (Building 315)
at Argonne National Laboratory, Argonne, Illinois**

AGENCY: U. S. Department of Energy (DOE)

ACTION: Finding of No Significant Impact (FONSI)

SUMMARY: DOE has prepared an Environmental Assessment (EA), DOE/EA-1519, evaluating the decontamination and decommissioning of the Zero Power Reactors (ZPR) in Building 315 at Argonne National Laboratory (ANL), in Argonne, Illinois. The proposed action is needed to ensure the protection of the long-term health and safety of the public, DOE and contractor employees, and the environment, consistent with DOE Order 5400.5, *Radiation Protection of the Public and the Environment*.

Based on the analysis in the EA, DOE has determined that the proposed action does not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act (NEPA) of 1969. Therefore, the preparation of an environmental impact statement is not required.

DESCRIPTION OF THE PROPOSED ACTION: DOE is proposing to decontaminate and decommission the ZPR facilities in two phases: ZPR-6 would be the focus of Phase I and ZPR-9 would be the focus of Phase II. Building 315 was completed in 1962 and contained two cells for holding ZPR-6 (Cell 5) and ZPR-9 (Cell 4). These reactors were constructed to develop further knowledge and understanding of the physics of fast reactors. ZPR-6, also called the Fast Critical Facility, focused on fast reactor studies for civilian power production. ZPR-9 was used for nuclear rocket studies and fast reactor studies. Both reactors operated from the mid-1960s until 1982 when they were shut down. The control panel for ZPR-6 was removed in 1997. The control panel for ZPR-9 has also been removed and the ZPR-9 reactor has been partially dismantled. The operating power level of the ZPRs was usually restricted to well below 1,000 watts, which kept levels of radioactivity very low.

Both ZPR-6 and ZPR-9 are no longer in use and have been in safe dry storage since 1982. The Melt Attack and Coolability Experiments (MACE) and Melt Coolability and Concrete Interaction (MCCI) Experiment are currently being conducted in Cell 4 where ZPR-9 is located.

In 1999 and 2001, DOE characterized ZPR-6 and ZPR-9 to evaluate the presence of radiological contamination and the presence of any non-nuclear hazardous or toxic material. Beta-gamma contamination is the predominant radiological hazard identified throughout Cells 4 and 5. The isotopes of major concern are uranium-238, thorium-234, and cesium-137. The total isotopic inventory in ZPR-6 and ZPR-9 is estimated to be less than 2 curies.

In addition, most of the wall surfaces were painted with a lead-based paint. Asbestos-containing material has also been identified in the floor tile and floor tile mastic. Oil containing polychlorinated biphenyls (PCB) and PCB-contaminated paint may also be present.

The decontamination and decommissioning of the ZPR facility will occur in two phases as funding and other programmatic work allows. In Phase I, DOE will decontaminate and decommission ZPR-6 and Cell 5. In Phase II, DOE will decontaminate and decommission ZPR-9, Cell 4, and the remaining portions of the ZPR facility. Phase II would begin once the existing MACE and MCCI experiments no longer required the space.

The proposed action includes activities such as decontamination, disassembly, size reduction, waste packaging, and transportation of waste to offsite disposal sites. In both Phase I and Phase II, all work would be performed inside Building 315 or immediately outside of the building in previously disturbed areas.

Approximately 258 cubic meters (9,100 cubic feet) of contact-handled low-level radioactive waste (LLW) and 13 cubic meters (450 cubic feet) of mixed LLW will be generated, packaged, and shipped for disposal at either the Hanford Site in Richland, Washington; Nevada Test Site (NTS) in Mercury, Nevada; Envirocare, a permitted and regulated commercial site in Clive, Utah; or a combination of those sites. In addition, up to approximately 6 cubic meters (200 cubic feet) of hazardous waste, 1.5 cubic meters (50 cubic feet) of asbestos, and 28 cubic meters (1,000 cubic feet) of nonradioactive and nonhazardous debris waste would be generated. These wastes will be recycled if practicable (lead), or disposed of at permitted disposal sites in accordance with DOE policies and procedures.

A final status release survey would be conducted at the completion of each phase to confirm that radiological release criteria for the building were met in accordance with DOE Order 5400.5. Completion of Phase I and Phase II would allow Cells 4 and 5 in Building 315 and associated facilities to be released for unrestricted use. Each phase is expected to take 12 months and 12,000 worker-hours (approximately six temporary workers) to complete.

ALTERNATIVES: Under the no action alternative, ZPR-6 and ZPR-9 would not be decontaminated and the existing equipment would not be removed. The facilities would be maintained in their present safe shutdown condition. Surveillance and monitoring activities would continue to ensure adequate containment of radioactive contamination, provide physical safety and security controls, and allow for personnel access. The facility would remain unavailable for other beneficial uses. DOE would also continue to incur costs for surveillance and monitoring activities at the facility. Annual surveillance and maintenance costs for ZPR-6 and ZPR-9 are approximately \$100,000.

ENVIRONMENTAL IMPACTS: Impacts of activities associated with the decontamination and decommissioning of the ZPR reactors and associated facilities were analyzed in the EA. The decontamination and decommissioning activities will occur within Building 315 or immediately outside of the building in previously disturbed areas. For this reason, no impacts are expected to current land use, biological resources (including sensitive, threatened, or endangered species or their critical habitat), visual resources, wetlands, or floodplains.

ZPR-6 is eligible for listing on the National Register of Historic Places for its engineering value and as a contributing component to the eligible Building 314/315/316 Complex. However, it would not be possible to remove the radioactive and hazardous contamination without destroying the reactor components. On September 20, 2004, DOE submitted a proposed plan to prepare Illinois Historic American Engineering Record documentation to mitigate the decontamination and demolition of ZPR-6. The Illinois Historic Preservation Agency has indicated that it will accept the documentation as appropriate mitigation.

The potential effects of decontamination and decommissioning activities include minor releases of dust and combustion gases from power equipment. In addition, minor amounts of dust containing asbestos and radionuclides will be released, but will be controlled through high-efficiency particulate air filters.

Decontamination and decommissioning activities will result in the exposure of workers to radiation. This exposure could result in an increased risk of a latent cancer fatality. For project workers, personnel exposures are expected to average 125 mrem (0.125 rem) per project worker over the duration of the proposed action. Workers engaged on either Phase I or Phase II of this proposed project would incur a 4.5×10^{-4} risk of a latent cancer fatality, or 1 chance in 2,000 that any one of the six workers would die from cancer caused by exposure to radiation as a result of this decontamination and decommissioning effort. For both phases of the proposed action combined, and assuming the same six workers worked on both phases, workers engaged on the project would incur a 9.0×10^{-4} risk of a latent cancer fatality, or 1 chance in 1,000 that any one of the six workers would die from cancer caused by exposure to radiation. No radiation exposure is expected to the population visiting the Waterfall Glen Forest Preserve or living in the surrounding communities.

LLW, mixed LLW, hazardous waste, solid waste, and wastewater will be generated as a result of the proposed action. These wastes will be disposed of in existing disposal facilities with adequate capacity to receive this waste.

Risks associated with natural events such as earthquakes, tornados, lightning, and floods will be negligible. DOE will implement specific protections to avoid and minimize the consequences of accidents during decontamination and decommissioning.

All transportation of wastes for offsite disposal would be conducted by truck. It is anticipated that approximately 15 truckloads of LLW, one truckload of mixed LLW, two truckloads of hazardous waste, and two truckloads of solid waste would leave the ANL site for shipment to disposal sites over the 24-month duration of the proposed action. This compares to the annual average of about 35 shipments of LLW (including mixed LLW) and 40 shipments of hazardous waste from ANL. Because Phase I and Phase II would occur sequentially and would each be approximately 12 months in duration, it is assumed that the decontamination and decommissioning of ZPR-6 and ZPR-9 would result in approximately 10 additional truck shipments per year, which would represent a 14-percent annual increase in LLW and hazardous waste shipments from ANL for the 2-year duration of both phases of the proposed action.

Approximately 77,000 to 110,000 round-trip vehicle-kilometers would be traveled to dispose of all of the waste types that would be generated by the proposed action, depending on the disposal site used. Based on national average rates of 0.35 accidents and 0.015 fatalities per million kilometers, the proposed waste shipments would result in an estimated 0.036 risk of an accident (1 chance in 30) and 0.0015 risk of a fatality (1 chance in 600). The risk of fatality would be due to crash impacts, not as a result of cargo hazard.

DETERMINATION: Based on the analysis in the EA, DOE has determined that the proposed decontamination and decommissioning of the ZPR reactors and associated facilities at ANL does not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of NEPA, and DOE will not prepare an environmental impact

statement. The proposed action alternative will have the least environment, health, and safety impact and is the most efficient and cost-effective alternative.

PUBLIC AVAILABILITY: Copies of the EA (DOE/EA-1519) are available from:

Kenneth Chiu
NEPA Document Manager
9800 South Cass Avenue
Argonne, Illinois 60439
(630) 252-2376

Copies of the EA are also available for review at the following locations:

Lemont Public Library
50 East Wend Street
Lemont, IL 60439

Indian Prairie Public Library
Reference Section
401 Plainfield Road
Darien, IL 60561

For further information regarding the DOE NEPA process, contact:

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